

REMARKS/ARGUMENTS

Claims 56-100 are currently pending in the instant application. Claims 60-64 and 84-95 are withdrawn from consideration pursuant to Restriction Requirement and Applicant's subsequent election. Claims 99-100 are newly added by the above amendment. Favorable reconsideration is kindly requested.

Applicant gratefully acknowledges the withdrawal of the previously made rejections (Office Action, p. 7). Applicant further kindly acknowledges the Office Action's prefatory explanation of its construction of the claim term "configured to deliver... a prescribed non-uniform... distribution" (Office Action, p. 2). This clear and explicit statement greatly facilitates the development of Applicant's response herein to squarely address the Examiner's interpretation of the claim language, and therefore efficiently advance prosecution. However, Applicant respectfully disagrees with the construction taken, as will be elaborated on below with reference to the application of the cited references.

Drawing and Specification Amendments

Figs. 79-81 are amended herein.

The power supply 300 is mentioned in paragraph [1080] as applying to Fig. 79 to Fig. 81. Paragraph [1073] further refers to Power supply 300 in Fig. 79. See also [0293], [1082], [1091], and [1093]. Accordingly, Power supply 300 is added to Fig. 79, Fig. 80 and Fig. 81 by the above amendment. Power supply 300 is added to Fig. 79 to correspond with the text in paragraph [1073].

In Fig. 80, the screen electrode 326 is added to comply with description in paragraph [1075]. The implied lead through insulator 316 to electrode 306 is added corresponding to description in Fig. 79.

Referring to Fig. 79, Fig. 80 and Fig. 81, Paragraph [1081] "Accordingly, they preferably break up the liquid column of first fluid 901 into micro droplets that are smaller than conventional drops, and preferably smaller than the diameter of the orifice 80."

Thus orifice 80 and flow 901 are added to Fig. 79, Fig. 80 and Fig. 81.

Paragraph [1089] cites. "By using such amplitude modulation and pulse width modulation methods, they provide benefits of varying drop size and/or micro-jet flow in systems where drop size is generally controlled by the size of the orifices 80 and the surface energy of the

first fluid 901 relative to the second fluid 904.”

Thus flow 904 is noted in Fig. 81.

Conforming amendments are made to the specification. No new matter has been added.

Rejection Under 35 U.S.C. § 102

Claims 56-59, 70-76, 78-82 and 96-98 are rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,859,071 to Woilles, et al. (“Woilles”). Applicant respectfully traverses the rejection, for at least the following reasons.

The Office Action avers that the features of claim 56 are explicitly disclosed or inherently present in Woilles. More specifically, the Office Action considers that “any provision of a non-uniform orifice location/ size/ orientation distribution would inherently provide the recited prescribed manner of operation of the fluids as recited by the claim” (p. 2). This observes that any binary change, i.e., presence in one position compared with absence in another, would be “non-uniform”. However, Applicant respectfully submits that this view diverges from Applicant’s usage of non-uniform distribution in claim 56. It is well established that “claims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification in giving them their broadest *reasonable* interpretation.” *In re Marosi*, 710 F.2d 799, 218 USPQ 289 (Fed. Cir., 1983) (emphasis in original; internal quotations omitted)

In particular, the view adopted by the Office Action would render each and every structure of finite dimension “non-uniform”, in the sense that finite injector and orifice apparatus must terminate at some point in space, and have a corresponding absence of that injection structure at a removed location. However, that reading of the claim, i.e., a reading that effectively excludes nothing from its scope, effectively reads that element out of the claims, for the purpose of making a rejection over distinguishable art. However, it has been held by the courts that the Office may not properly dissect a claim, excise subject matter from it, and declare the remaining portion of the mutilated claim to be unpatentable. The claim must be read as a whole. *In re Gulack*, 703 F.2d 1381, 217 USPQ 401 (Fed. Cir. 1983).

Moreover, according to Applicant’s instant disclosure, described is a more complex non-uniform distribution of orifice spacing, size and/or orientation. See, e.g., the complex non-uniform distributions schematically shown in Fig. 18, Fig. 19, and Fig. 20. Such configurations are schematically shown by differing orifice distributions in Figs. 9, 11, 16-17, and others.

Notwithstanding the differences between the binary (i.e., present/not present) discontinuity observed by the Office Action in Woilles, and the meaning that “non-uniform distribution” would convey to one of ordinary skill in the art in light of Applicant’s disclosure, Applicant amends claim 56 above to more clearly define the claimed structure. As amended, claim 56 recites “the non-uniform fluid distribution being taken in at least four differing regions at a plurality of locations along a curvilinear path transverse to the second flow, or streamwise along the second flow direction, respectively”. This amendment is fully supported through the original specification as filed, and no new matter has been added.

In contrast to claim 56 as amended, Woilles is concerned with generally uniform distributions. For example, in the Abstract, Woilles teaches “. . . opposed jets of the discontinuous phase striking each other to ensure droplet formation.” Claim 1 of Woilles recites “limited lengths of said respective cross jets from said spray nozzles constitute respective spray jets in a jet grid like pattern which extends over a whole cross section of said carrier pipe”.

In these configurations, Woilles implies preference for a uniform distribution of cross jets across the carrier pipe. For example, in pairs of jets 24 within the center ring. 12, and pairs of jets 20-22 between the inner and outer pipes. While outer tube 10 is axially displaced from inner tube 12, by prescribing opposed orifices, Woilles provides a similar axial distribution for these sets.

On the other hand, Woilles recognizes at most a binary distinction of regions: an “enriched region” in the bottom (or top) of the pipe vs. .the region above the enriched region. Citing European Patent No. 0060634 “a tapping conduit (4) having a tapping opening in this carrier pipe (2) to suck off a fraction of the flow of the fluid to be homogenized, this opening being placed a zone which is enriched by gravity in the discontinuous phase, this zone being the top or bottom zone of this pipe according to whether the discontinuous phase is more dense or less dense than the continuous phase, respectively”. Woilles provides for a binary (i.e., all or none) configuration of premix jets (26) to suspend this “discontinuous phase enriched zone”; “one or more other of the said injection nozzles are premixing nozzles (26), less numerous than the spray nozzles (20, 22, 24) and arranged upstream from them and downstream from the said tapping opening (4a) in the said discontinuous phase enriched zone, to form premix jets aimed toward the inside of the carrier pipes (2), in order to place into suspension a fraction of any of the discontinuous phase which has not been sucked off in this tapping opening.”

As shown in Figs. 1 and 2, all premix orifices 26 are near the bottom of the pipe to suspend this “enriched region” in with the fluid above it.

Woilles similarly provides a second binary (more/less numerous) configuration of additional opposed jets (20, 22) “the said spray nozzles (20, 22) are more numerous in the said enriched zone, in order that the maximum distance from one point of the said spray surface to the closest spray jet will be reduced within this zone and the energy dissipated by these jets per unit of volume will be greater there”. Thus, in Fig. 2, Woilles shows two extra pairs of jets 20-22 in the lower half of the cross section, i.e., six sets in the lower half vs. four sets in the upper half. Similarly in Fig. 1, Woilles shows an extra set of opposed jets 20-22 near the bottom half as opposed to the top half of the pipe. Woilles similarly provides an axial binary change with orifices 26 being upstream of the pairs of opposed 20-22 orifices in tubes 10 and 12, or the orifices 24 in tube 12.

Woilles also does not offer any teaching or suggestion relative to non-uniform orifice sizes, nor non-uniform orientation, nor in fact non-uniform fluid distribution. In each of these regards, Woilles is concerned with uniformity, of size, of orientation, and particularly of fluid distribution.

Therefore, taking that the term “non-uniform distribution” has meaning sufficient to distinguish the structure so described, as compared with a meaning under which each and every structure is in some sense “non-uniform”, at least in that it has finite dimension, Woilles does not anticipate claim 56. Specifically, Woilles is concerned only with binary distributions (e.g., presence/absence) and not with more complex distributions.

Furthermore, claim 56 is amended above to more clearly define that “the fluid distribution being taken in at least four differing regions along a curvilinear path transverse to the second flow, or streamwise along the second flow direction, respectively”. This feature of claim 56 is neither taught nor suggested by Woilles. The Federal Circuit has recently reiterated the strict novelty requirement for anticipation, holding “Because the hallmark of anticipation is prior invention, the prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’ ” *Net MoneyIN, Inc., v. Verisign, Inc.*, ___ F.3d ___, 88 U.S.P.Q.2d 1751 (Fed. Cir., 2008)

Therefore, Applicant respectfully submits that claim 56 is patentably distinguished over

Woilles. Claims 57-59, 70-76, 78-82 and 96-98 each depend, either directly or indirectly, from independent claim 56, and incorporate the features of claim 56 by reference. These dependent claims are each separately patentable, but in the interest of brevity they are offered as patentable for at least the same reasons as their underlying independent base claim. Therefore, Applicant respectfully submits that the rejection has been obviated, and kindly requests favorable reconsideration and withdrawal.

Rejection Under 35 U.S.C. § 103

Claims 68-69, 77 and 83 are rejected under 35 U.S.C. § 103(a) as obvious over Woilles in view of taken alone. Claims 65-67 are rejected under 35 U.S.C. § 103(a) as obvious over Woilles in view of U.S. Patent Application Publication No. 2003/0086333 by Tsouris, et al. ("Tsouris") and U.S. Patent No. 3,570,513 to Paine ("Paine"). Applicant respectfully traverses the rejections, for at least the following reasons.

Claims 65-69, 77 and 83 each depend, either directly or indirectly, from independent claim 56, and incorporate the features of claim 56 by reference. Even presuming, *arguendo*, that the proposed modification to Woilles were within the level of ordinary skill in the art proposed in the Office Action, and that Tsouris and/or Paine teach all that is attributed to them, and further presuming that there is some objective apparent reason to modify Woilles as proposed in the Office Action, Applicant respectfully submits that the claims are nonetheless patentably distinguished. Neither the proposed modification of Woilles in view of no reference, nor the proposed combination with Tsouris and/or Paine, ameliorates the underlying deficiency of Woilles with respect to claim 56 as noted above.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Therefore, while these dependent claims are each separately patentable, in the interest of brevity they are offered as patentable for at least the same reasons as their underlying independent base claim 56. Therefore, Applicant respectfully submits that the rejection has been obviated, and kindly requests favorable reconsideration and withdrawal.

New Claims

New claims 99 and 100 are presented. These claims generally separate out features previously part of claim 56, namely the non-uniformity of the prescribed distributions, and make them optional dependent features. No new matter has been added.

Conclusion

In light of the foregoing, Applicant respectfully submits that all claims are patentable, and kindly solicits an early and favorable Notice of Allowability.

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Respectfully submitted,



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